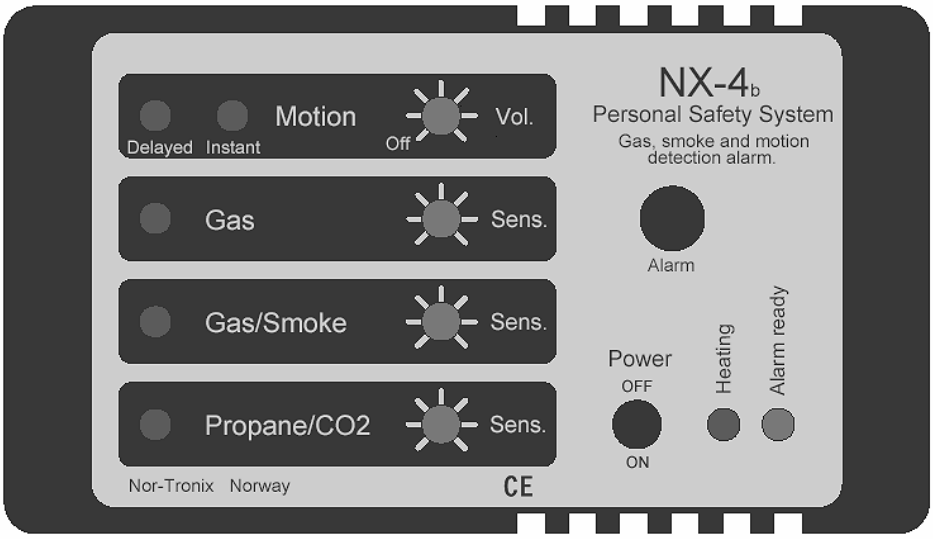
User's manual
and installation instruction

NX-4b



Personal Safety System for mobile homes

Alarm for gas, smoke and motion*

* (Motion detectors optional)

Rev. 13b

Introduction

Thank you for purchasing a NX-4 security system. Since your and others safety may relay on proper function of this product, we ask you to carefully read this manual so you can fully understand how to use it, how it works and how to install it. It is not very complicated.

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What is NX-4 intended for?

NX-4 is a personal safety alarm system primarily intended for use in mobile homes where health and life can be endangered if you are attacked with narcosis gas by robbers, gas leakage from your own gas apparatus, fire or unknown persons (which may be robbers) close to the vehicle*. All the built in functions in the NX-4 will provide an added insurance against these hazards. You might look at NX-4 as your "electronic night watch".

*Motion detectors are optional.

What functions does NX-4 have?

1. *Warning of "narcosis" gases.*

Alarms many toxic gases with anesthetic or suffocative effect on humans. The four sensors will together cover a very wide range of known and unknown gases. Two of the sensors are located in the main unit to detect light gases and two are located low in the external unit to detect heavy gases like propane, CO2 and other "narcosis" gases.
Many of these gases will, in best case, in medium concentrations, make you sleep very heavy. If you wake up you may act unconcerned to robbery. In stronger concentrations gas is life threatening.
NX-4 will sound the alarm long before these gases reaches dangerous concentrations. If outside lamps are connected to NX-4, they will flash when the "Gas" alarm is trigged. This will help to attract attention from people near by.

2. *Warning of propane/butane gas.*

This sensor is located in the external sensor unit and is installed by the floor in order to detect the heavy propane gas as early as possible. This sensor is also very sensitive for hydrogen from over charged batteries.

3. *Warning of fire.*

The "Gas/smoke" sensor detects smoke by sensing the CO gas generated from the fire. It also detects many other pollutions, exhaust and bad air quality in general. This detector may alarm even if no smoke is evident. This is in most cases because of poor ventilation.

4. *Warning of persons nearby.*

NX-4 can be equipped with outside mounted motion detectors (option) to detect persons close to the vehicle. Occasional by passers will not create an alarm, but if motion persists in the alarm zone for certain amount of time, the indoor alarm will sound. One detector on each side will alarm if a person walks around the vehicle, but not if someone just passes by.

Connection of external equipment.

NX-4 has several external alarm outputs for connection of equipment like additional alarm sounder, forwarding of alarm signals to a cellular phone alarm sender, external flood lights, propane gas shut off valve and so on.

What gases does the NX-4 detect?

NX-4 has four different gas detectors. Each detector has a specific target gas, but they all will also overlap each other to a certain extent. Together they will detect most gases that are toxic, anesthetic, explosive or suffocative. Two of the sensors are located in the external low mounted Propane/CO_2 sensor housing.

NX-4 Main unit		**Eksterne Propan/CO_2 sensor**	
Gas sensor:	**Gas/smoke sensor:**	**Propane sensor:**	**CO_2 sensor:**
Toluene	Hydrogen	Propane/butane	CO_2
Ethanol	Ethanol	Hydrogen	
Hydrogen sulfide	Propane/butane	Ethanol	
Amonia	CO		
Hydrogen	Methane		

How to use the NX-4

NX-4 is normally used when you are sleeping. Flip the power switch to “ON” position and the red “Heating” lamp will light. After a heating period of 2-3 minutes, the green lamp will light and NX-4 is ready, but the CO_2 detector will have a heating time of 30 minutes before it works.
The sensitivity of the three gas detectors must be adjusted before the NX-4 is ready for use. When this is done, the sensitivity is adjusted only when needed or if you are entering a new climate zone or season of the year.

Sensitivity adjustment:

- Let the NX-4 be powered for an hour or more
- Turn the sensitivity knob for the “Gas” sensor up to the point the alarm triggers
- Then turn the knob down two scale marks (or more) from the point the alarm trigged
- Repeat this procedure for all three sensibility adjustments
- Readjust the sensitivity when entering a new climate zone or season of the year, or if needed otherwise
- When first installed or out of use for a long time, readjust the sensitivity after a day or two.

Many people in a small space will normally require less sensitivity because of generally poorer air quality. Too high sensitivity setting will increase the risk of unwanted alarm. Very low sensitivity setting (turned all the way down) will not totally disable the alarm, but a higher density of gas is required to trigger the alarm. In general there is no need to set a very high sensitivity. NX-4 will react very well to gas anyway. Do your own experiments to see how sensitive you want the alarm to be.
The CO_2 detector has fixed sensitivity and is not affected by the “Propane/CO_2” sensitivity knob. The CO_2 sensor is connected to the Propane sensor input so high CO_2 concentrations will flash the “Propane/CO_2” lamp and alarm with an uneven pulsating tone. Any other gas will give constant light in even pulsating tone and light the respective lamp. This way there will always be possible to determine witch sensor that triggered the alarm.

If outside mounted motion detectors are connected:

The motion detectors have two stages. The first stage is triggered immediately when motion is detected. No alarm will sound, but the “Instant” lamp and outside light will light (if outside lamp is connected). The next stage is delayed and gives an audible inside alarm if motion persists in the detection zone. If you are at a “safe place” where people normally pas by, you don’t want an audible alarm when outside motion is detected. Turn down the volume knob for “Motion”, all the way or something in between if you want a discreet alarm if motion is detected outside.
If outside lamp is connected it is useful to leave the NX-4 powered in order to make a welcome light for your selves when coming home in the dark. Automatic outside lamps also have a frightening effect on burglars.
The delay (or sensitivity) is adjustable with the Motion detector sensitivity adjustment knob inside the NX-4 (see the chapter “Adjusting the sensitivity for the Motion Detectors”).

How to test the NX-4

Test shall be performer regularly and always after a long period of storage.
Turn up the sensitivity adjustment knobs just until the alarm sounds and back again. At this time also note how much you have to turn up the sensitivity up to trigger the alarm. This shall normally be 2-3 scale marks. Repeat this procedure for all three sensitivity adjustment knobs. The CO_2 detector (located in the external low mounted sensor housing) is tested by blowing directly at the sensor with a few deep breaths. You can use a flexible straw or tube to make it easier for the breath to hit the sensor. The CO_2 content in your breath is just enough to trigger the alarm. Remember that the CO_2 detector has 30 minutes warm up time before it can be tested. The CO_2 detector has automatic sensitivity adjustment and will not be tested or affected by the "Propane/CO_2" sensitivity adjustment knob. Propane and CO_2 alarm is indicated with the same lamp on NX-4, but you can distinguish the two by different sound and flash pattern. CO_2 gives an uneven pulsating tone and a flashing lamp, all other gases gives even pulsating tone and constant light (in the indicator lamp on NX-4).
A more reliable test is to apply real gas. When NX-4 has been powered for a while, hold an open bottle of alcohol in front of NX-4 and blow over the bottle against NX-4. This should give "Gas" and "Gas/smoke" alarm. The Propane detector is best tested with a short squirt of gas from a cigarette lighter directly into the external low mounted sensor housing.
Motion detector test:
The outside mounted motion detectors are best tested by walking in the detector zone until the alarm sounds. This should normally be approximately 30 seconds.

False alarms

NX-4 will normally react on the propellant gas in spray cans and many other chemicals. If the air quality gets poor because of insufficient ventilation or cigarette smoke, the alarm can react. If you desire to accept the poor air quality, reduce the sensitivity settings to the desired level.
The "Gas" and "Gas/Smoke" detectors are sensitive to alcohol and will normally react if alcohol is handled near the NX-4. If you are breading on the NX-4 after consuming alcohol, it shall react.

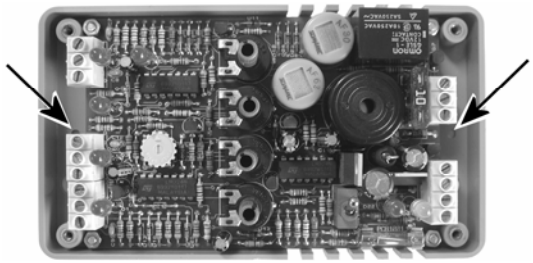
Smokers may experience alarms even if they are not smoking at the moment. This is because of the air quality is generally poorer than normal and a small added pollution could be enough to trigger the alarm. If so, a lower sensitivity setting or added ventilation may be required.
NX-4 is very sensible to car exhaust so if NX-4 is ON while driving, you will experience alarms when driving in tunnels, close behind other cars or in heavy traffic. However, this should not be a problem because NX-4 is normally OFF while driving. It does not harm anything to have it ON, but if motion detectors are installed, the alarm will sound constantly (and outside lamps light (if installed)).

The motion detectors reacts on everything hotter than the background, as long as it moves. That includes animals, sunlight behind a branch moving in the wind, warm gusts and humans. This will cause the light to come on (if equipped), but no alarm will sound at this point. If the motion in the detection zone persists for a while, the alarm will sound. This delay will in most cases eliminate false alarms, but if false alarms still occur, you can reduce the sensitivity. More detectors create more (false) detections and often requires lower sensitivity setting). False detections lights the outside light, but that is not considered a problem. (Also see the chapter "Adjusting the sensitivity for the motion detectors").

Installation

Location:
Install the NX-4 main unit approximately in the height of your head in a free and open place in the living area where it is easy to reach. Do *not* install it inside a locker. NX-4 will react on alcohol, so avoid placing NX-4 close to a cellaret if possible. NX-4 will react on "spent air" human breath with alcohol, perfume and human "wind" so if the ventilation is poor, this may create "false " alarms. Therefore install NX-4 at an open location where such gases are thinned out before they reach NX-4. It is *not* recommended to install NX-4 too close to a bed and absolutely not in a small closed sleeping compartment. If the best location is too far from the bed to hear the alarm, install an extra alarm sounder by the bedside.
A logical place to install NX-4 is beside the electrical distribution center often located above the door in motor homes or at the wardrobe locker in caravans. At these locations you often get easy access to electricity. To make the installation easy it is highly recommended to install NX-4 on a panel or locker that has access for the wiring from behind. Also keep in mind tat the external Propane/CO_2 sensor also shall be installed near by. In general the location of NX-4 is not critical in order to detect gas.

Attachment:
Remove the four screws retaining the front of the NX-4 enclosure. Attach NX-4 to the wall with two screws trough the holes shown. Drill holes for the wires trough the wall in the slots in the enclosure. (If the wires shall not go trough the wall, drill holes in the side of the NX-4 enclosure). When all wires are connected, reinstall the front. Be careful not to bend the red indicator lamps in the process.


attachment holes

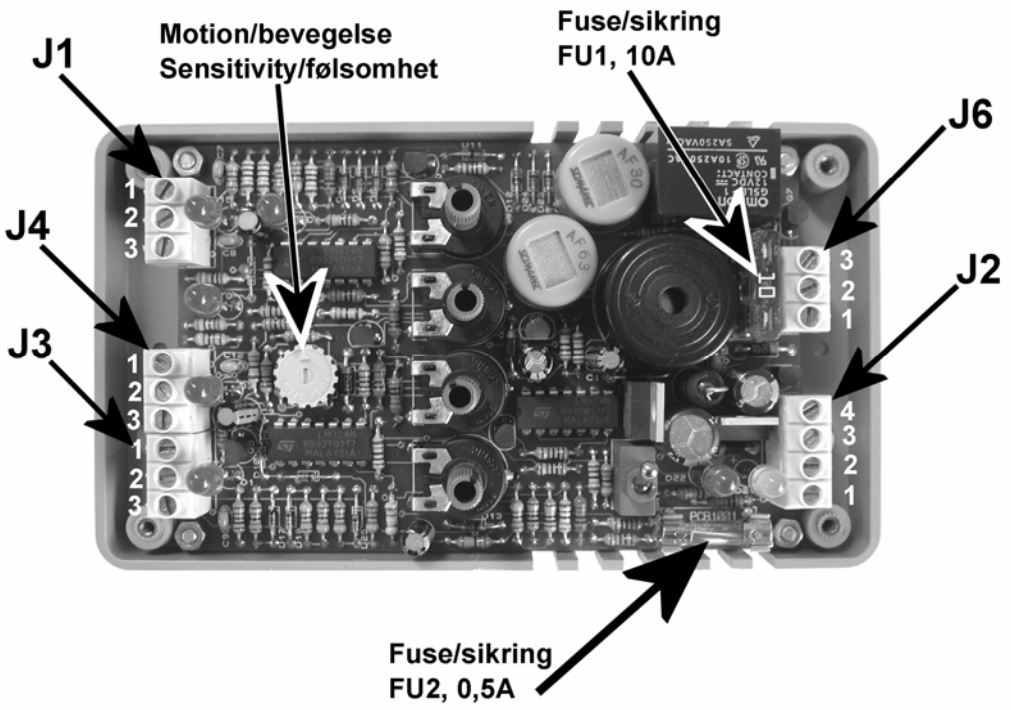
Install the external Propane/CO_2 sensor approximately 10-20 cm above the floor. The location is not critical. Attach it by removing the protective film on the double-sided tape or put a screw through the lower part of the enclosure. Route the wire to the NX-4 unit (preferably behind a panel, inside a locker or inside the door gasket).

Power supply:
If external outside lamps are not used, NX-4 can be powered from any circuit without any noticeable power capacity because NX-4 consumes very little power (2W). If outside lamps are connected directly to NX-4 the power must be taken from a circuit with larger capacity than the already existing load and the extra lamps together. Alternatively install a relay for the lamps in order to reduce the power requirement to the NX-4 unit. (An alternative to heavy gauge wires to NX-4).
If Outside lamps are connected, the fuse inside NX-4 (for external lamps) must be smaller than the fuse on the circuit it is powered from. This way the NX-4 will keep on working as a gas alarm even if the outside lamps are short circuited and the fuse blows. Change the existing 10A fuse with a smaller one if the power of the lamps are considerable less than this.
In motor homes, preferably power NX-4 from a circuit that is turned off when the main switch is off.

Two Propane sensors
Some motor homes has double deck floor. If desired, NX-4 can be equipped with two propane sensors connected in parallel. One in the living area and one below the floor.

Connection

All wire terminal blocks are referred to as J1, J2, J3 and so on. Each ”J-block” has numbered pins. The illustration below shows the NX-4 internals when the front is removed. Also note the location of the internal fuses.



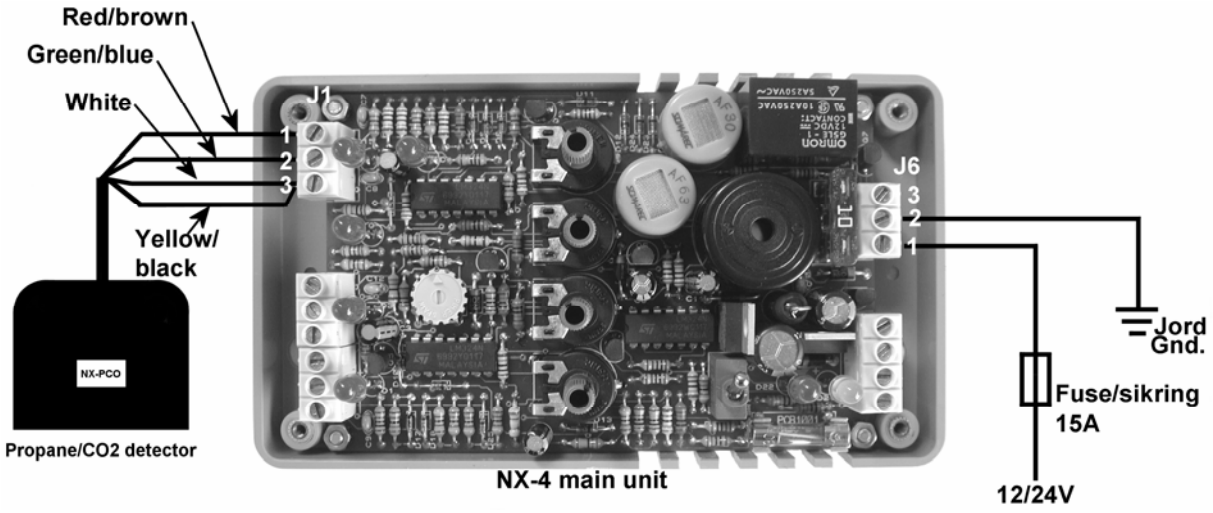
The table below shows all the connections and their functions. (Se the chapter “Technical specifications” for electrical data).

Terminal block J1 Propane/CO_2 sensor input		**Terminal block J3** Motion detector, positive signal	
1	+5V DC out	1	+12V ut
2	GND	2	GND
3	Signal input	3	Signal input, active positive
Terminal block J2 External outputs		**Terminal block J4** Motion detector, negative signal	
1	All gas detectors combined	1	+5V out
2	Propane gas separate	2	GND
3	Motion delayed	3	Signal input, active low
4	Extra alarm sounder	**Terminal block J6** Power supply in and lamp output	
		1	12 / 24V input (Power supply)
		2	GND
		3	12 / 24 V out to lamps

NB. The external signal outputs are unfused and will be destroyed if overloaded.

Basic wiring.

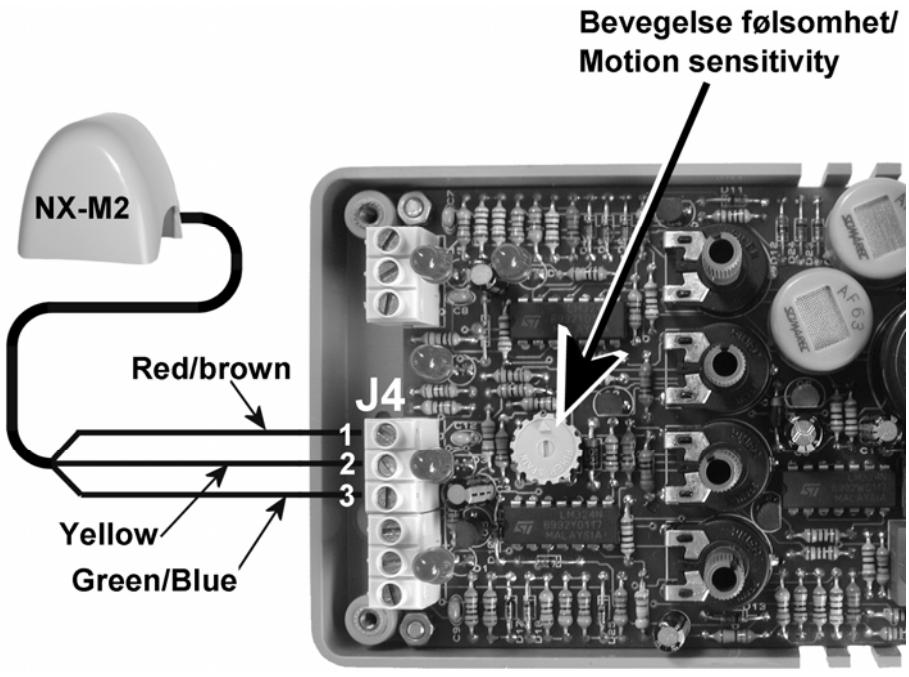
The illustration shows the power supply and propane/CO_2 detector connected to the unit.
The power line is shown with a 15 Amp fuse, but smaller fuse can be sufficient if not outside mounted lamps are used and connected directly to NX-4 without relay (More about this in the chapter "Installation").



Different types of wire can occur. When there is referred to color "Red/brown" it means one of the colors, not both.

Wiring external motion detectors

Connect motion detectors type NX-M2 to terminal block J3. Many detectors can be connected in parallel. (Terminal block J4 is for detectors with active high/positive signal. Se the chapter "Technical specifications" for more information).
I you want to totally disable the motion detector function (not only the alarm sound that you can turn off on the NX-4 main unit), you can install an external switch on the power cable to the motion detectors (J4 pin 1).



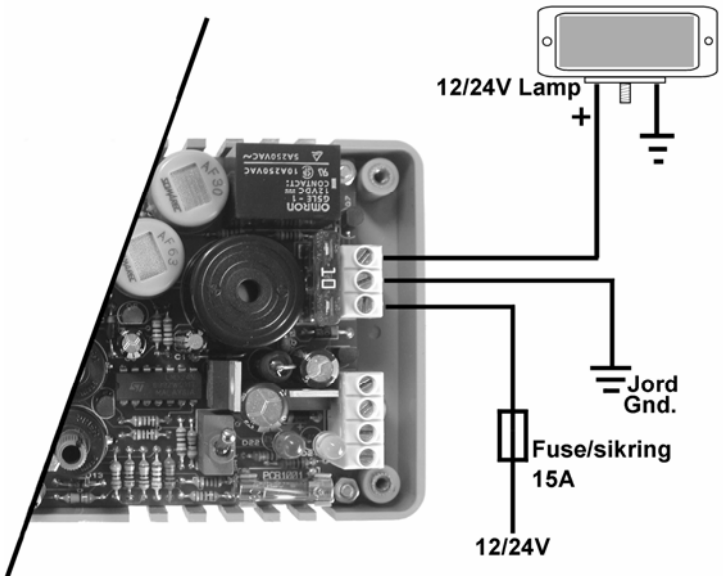
Different types of wire can occur. When there is referred to color "Red/brown" it means one of the colors, not both.

Adjusting the sensitivity for the motion detectors

The sensitivity for the motion detectors can be adjusted to your needs. Normally, the mid position of the adjustment wheel is a good starting point if you have one or two detectors. (The adjustment wheel is yellow and located inside the NX-4 unit). If more than two detectors are used, lower sensitivity may be desired. If you are experiencing false alarms, turn down the sensitivity (More info in chapter “False alarms”). Maximum sensitivity is when the knob is turned fully clockwise, and the opposite. Do your own test of the sensitivity by walking into the detection area and see how long it takes before the alarm reacts. A good starting pint is about 30 seconds. (If you are standing still you are invisible to the detectors). Do not set it too sensitive to avoid false alarms from animals, sunlight, warm winds, occasional by passers and so on.

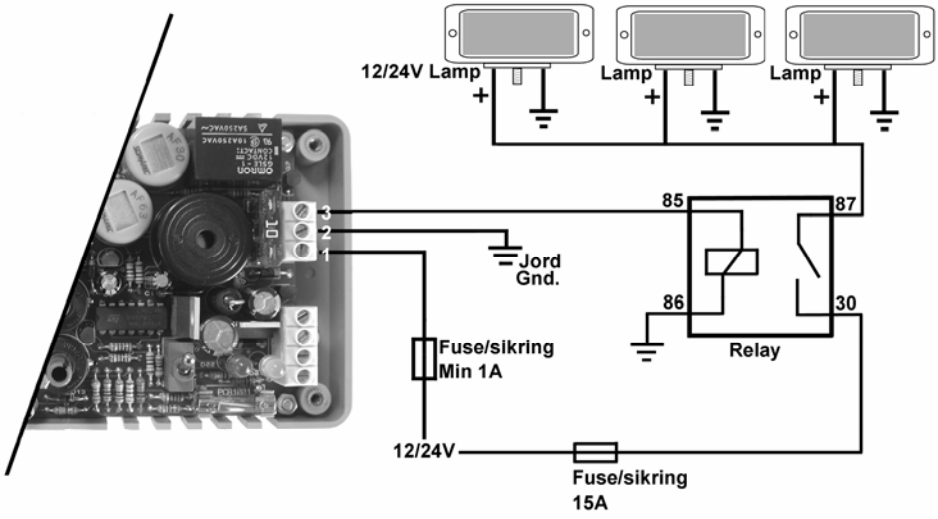
Connection of external outside lights

You can connect this output to an already existing outside lamp with a wire directly from NX-4 to the lamp without any fuse or switch in between. The lamp will automatically be turned on by NX-4 (when powered) or manually with the existing light switch. NX-4 is not damaged if you supply current *in* to the lamp output. You can also connect this output to the hazard lights or parking lights if desired. Maximum load is approximately 100W (if extra relay is not used). Suitable lamps can be outdoor lamps for motor homes or caravans, working lights for tractors, extra lights for cars, backing lamps and so on.
See more about wire gauge and fuse size requirements in the chapter “Installation, power supply”.



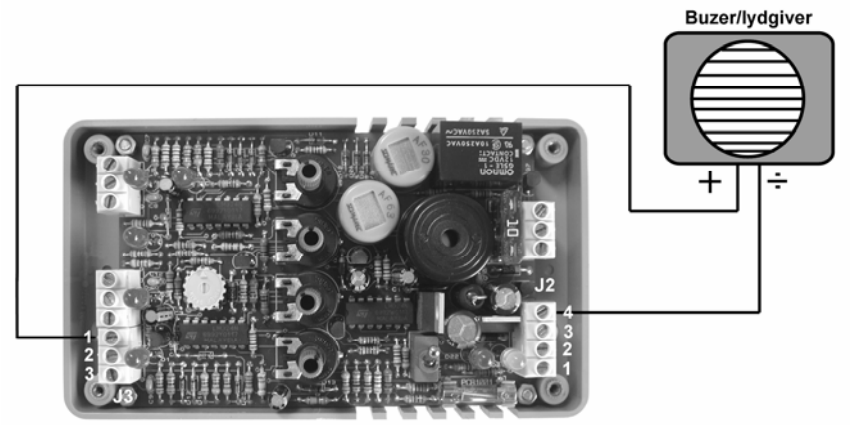
Connecting external lamps with extra relay

If you want to connect more lamps requiring more current than NX-4 can deliver directly (approx 100W), an extra relay can be used. With an extra relay you also take load away from NX-4 so you can supply NX-4 from a low capacity circuit. This can in many cases simplify the installation if NX-4 is already connected to a circuit without the capacity to supply the lamps.



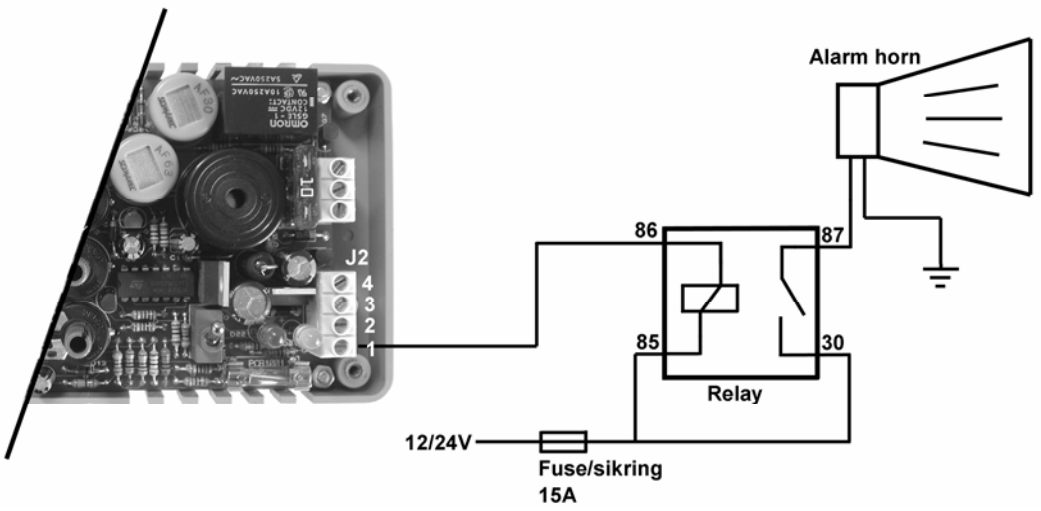
Connecting additional alarm sounder

Extra alarm sounder can be desired if the NX-4 is located far away from the bed or if you have a hearing damage. Almost any 12V type of sounder consuming no more than 10-15mA will work (also use 12V types in 24V circuits).
When you are adjusting the volume at the outside detector alarm, the volume at the extra sounder also is adjusted.



Connection of external outputs with relay

The external outputs are signal outputs with limited current capacity. Extra relay must in most cases be used. This example shows how to connect a powerful siren. The same circuit can be used for all outputs at terminal block J2. The outputs can be combined by directly connecting them together at J2. Se the chapter “Technical specifications” for more information about the electrical characteristics in



Maintenance

No particularly maintenance is required, but regularly readjusting of the gas detector sensitivity is recommended. This will ensure proper function and avoid false alarms.
Regularly do a full function test as described in the chapter “How to test NX-4”.

If NX-4 is used constantly, we recommend sending the unit for service and possible sensor replacement after approximately 6 years.

If NX-4 has been exposed to high air humidity or left OFF for a longer period of time, it may be required to leave it ON for a day or two before you readjust the sensitivity and doing a quick function test.

If outside motion detectors are used, they have to be cleaned on regular basis. Clean with a cloth and mild soap water. Avoid flushing directly at the detectors.

Technical specifications NX-4.

Operating voltage:		11-30V DC
Power requirements:		2W* (approx. 140mA at 12V and 70mA at 24V)
Relay output for external lamps	J6 pin 3	Max 10A load
Operating temperature:		10-30 °C
External alarm outputs	(All alarm outputs are active as long as NX-4 is alarming)	
Combined output for all gas detectors	J2 pin 1	Active low. Max load approx. 0,4A each. 47k ”pull up” resistor. Low level <=1V.
Separate output for the propane detector	J2 pin 2	Active low. Max load approx. 0,4A each. 47k ”pull up” resistor. Low level <=1V.
Output for delayed motion	J2 pin 3	Active low. Max load approx. 0,4A each. 47k ”pull up” resistor. Low level <=1V.
Output for extra alarm sounder	J2 pin 4	12V approx. 10-15mA max load. Volume adjustable. Active low analog output.
Motion detector inputs		
12V output in 12V systems	J3 pin 1	10-12V, max approx. 200mA load
12V output in 24V systems	J3 pin 1	12V, max approx. 50mA load
5V output in 12/24Vsystems	J4 pin 1	5V, max approx. 50mA load. Current limited by a 10 ohm resistor in series.
Signal input positive	J3 pin 3	3,5-30V positive signal. Approx. 20k input. imp.
Signal input negative,	J4 pin 3	Active below 1,5V. Approx. 20k input. imp.
Delay time at stage 2 for the motion detector alarm		Approx. 6-30 sec. provided the signal is constant from detectors. Adjustable with internal potentiometer.
Dimensions (L, W, H)		143x82x38mm
Weight:		210g

* With Propane/CO_2 detector connected, but without any other external equipment. (NX-M2 motion detectors power consumption can be neglected).

To visualize the power consumption of NX-4, a 12V 70 Ah battery will be emptied in 7 weeks if used only at night.

Connection terminals overview

Connector J1 Propane sensor		**Connector J3** Motion detectors with positive signal	
1	Red/brown +5V	1	+12V out
2	Green GND/Ground	2	GND / Ground
3	White Signal	3	Signal input, active high/positive
Connector J2 External outputs		**Connector J4** Motion detectors with negative signal	
1	All gas detectors combined	1	+5V out
2	Propane gas separately	2	GND /Ground
3	Motion, delayed	3	Signal input, active low/negative
4	External alarm sounder	**Connector J6** Power input and lamp output	
		1	12 / 24V Power supply
		2	GND / Ground
		3	12 / 24 V output to external lamps

CE Approval:

NX-4 meets the following standards:

Immunity: EN 50082-2
Emission: EN 50081-1

Safety

NX-4 is made as a safety aid device. It can't guaranty safety. If NX-4 shall be used in environments where NX-4 shall provide vital safety alone, special requirements apply. Consult the manufacturer for information.

Warranty

1 year from the date of purchase. The warranty cover faults related to manufacturing. The warranty does not cover damages by incorrect connection, use or normal wear.

Service:

If your NX-4 needs service, consult your dealer.

Remember to provide an exact fault description.

Manufacturer:

Nor-Tronix
Norway
www.nor-tronix.no

Your dealer:

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